OAK RIDGE RESERVATION
Environmental Management

SITE SPECIFIC ADVISORY BOARD

June 4, 1999

T. W. Joseph, Ph.D.
U.S. DOE/ORO
P.O. Box 2001
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Oak Ridge, TN 37831

Oak Ridge Reservation Annual Site Environmental Report for 1997

Dear Dr. Joseph:

The Oak Ridge Site Specific Advisory Board (ORSSAB) has reviewed the *Oak Ridge Reservation Annual Site Environmental Report (ASER) for 1997*, as well as the separate Summary. We are pleased to recommend changes in emphasis that we believe would make information contained in future reports more accessible to the public and therefore more valuable to the Department of Energy.

The ORSSAB approved the enclosed recommendations at our June 2, 1999 Board meeting and we hope they will be considered during preparation of the ASER for 1998.

Sincerely,

William M Pardue

William M. Pardue, Chair

WMP/sb

Enclosure

Cc: Rod Nelson
Marianne Heiskell
Earl Leming, TDEC
Jon Johnston, EPA Region 4

Recommendations on the
Oak Ridge Reservation Annual Site Environmental Report for 1997
From the Oak Ridge Site Specific Advisory Board

June 2, 1999

The Oak Ridge Site Specific Advisory Board (ORSSAB) has reviewed the Oak Ridge Reservation Annual Site Environmental Report (ORR ASER) for 1997, as well as the separate Summary. We are pleased to recommend changes in emphasis that we believe would make information contained in future reports in this series more accessible to the public and therefore more valuable to the DOE. The report is formidable, reflecting the comprehensive monitoring effort, so we recognize that added detail in one area might require reduced coverage elsewhere.

The Tennessee Department of Environment and Conservation's letter dated March 13, 1999 provided suggestions that seemed quite thoughtful; the Board suggests you consider their suggestions favorably.

The separate Summary is attractive in part because of the involvement of a high school class. Since the two documents will often become separated, we believe a summary should also be included within the main document, using some of the material now placed in the Summary. We comment on the Summary in the next section.

For each document, we suggest that goals be carefully formulated and explicitly included in the report. One goal is presently to document the current generally good success in complying with the variety of environmental regulations at each plant. This goal is generally met, but a typical reader needs more instruction about the basis of each regulatory standard. If the report itself satisfies a regulatory requirement, that fact should be made apparent.

Even though the title of this document and its content apparently focus on environmental issues, the information on radiation and on toxic chemicals, in Appendices A and B, respectively, suggest that the document's authors accept as a goal the coverage of health-related risks or evaluations related to the radiation and the non rad chemical exposures.

We suggest a third major goal, met in part for 1997, to indicate the level of success demonstrated in the Environmental Management Program. A qualitative statement should be made about the general environmental state of the Oak Ridge Reservation (ORR). Action has been completed for at least three Records Of Decision: Lower East Fork Poplar Creek, Watts Bar Lake, and Clinch River/Poplar Creek. Estimates of present risks to the public for important exposure pathways from these areas ought to be prominent and very carefully explained. (See comment on page 5 below).

In all aspects, we believe the report's authors should strive for a presentation that is scrupulously unbiased. Some readers do not trust the DOE to present their own environmental performance; these readers will be alert for any inaccuracies or signs of DOE using their printing press to "varnish" the factual situation. We suggest a few areas below where suspicions may be awakened by the 1997 report. The current performance of the DOE is sufficiently good that these reports can and must lack all bias.

The Environmental Report Summary

The Summary contains a useful *Preface* and sections on the *Oak Ridge Reservation*, *Environmental Compliance*, *The Environmental Management Program*, *Measuring Exposure and Assessing Risk*, and *Environmental Monitoring* in addition to summaries of current results attained. The "extra" sections have great potential value both for the reader who lacks adequate background and for better-grounded readers who need refresher material. A future Summary should take additional care with these extras as discussed below.

The second paragraph of the *Oak Ridge Reservation* section should recognize, as indicated on the map, that almost all the ORR lies within the City of Oak Ridge. As shown by comparison with the attached map (Attachment 1), the northern city boundary west of Wisconsin Avenue is shown incorrectly in the 1997 report. The acreage of the ORR should be checked, and the map used should show that the TVA land that was to be the site of the Clinch River Breeder Reactor is currently outside the ORR.

In the listing of federal environmental acts in the section on *Environmental Compliance*, the federal act (Clean Air Act) that produces the National Emission Standards for Hazardous Air Pollutants (NESHAP) regulation of 10 mrem maximum for dose to a member of the public from airborne releases should be identified, since that limit is frequently quoted in the text. Since DOE is internally regulated relative to radiation sources, the resulting requirement should also be listed.

Within the section on the *Environmental Management Program*, the material on public involvement might best include the Site Specific Advisory Board as well as updated material on public studies on the future use of contaminated lands.

A section on *Measuring Exposure and Assessing Risk* is difficult to compose because rather advanced concepts must be approached in a simplified manner that is not incorrect. Check carefully any sentence on the effect of ionizing radiation on humans. The 1997 report contains the unfortunate statement that "Exposure to background levels of radiation is assumed to carry no health risk." Rather, most recognize that this risk (a lifetime cancer incidence risk around one percent) is unavoidable. While some scientists do believe that small radiation doses have not been proved harmful, we believe no regulatory authority accepts such a complacent concept. Certainly, the DOE has not promoted such an assumption.

The table of radiation doses commonly encountered (page 9 in 1997) should be studied carefully before re-use. It should clarify whether the listed x-ray doses to portions of the body (*e.g*. chest or GI tract) are the doses incurred in those organs or values corrected to effective or whole-body doses. Check also whether 5000 mrem is still the routine annual occupational dose limit for DOE radiation workers. The concept of "as low as reasonably achievable" (ALARA) may need to be referenced to indicate that radiation doses are controlled below established limits, not that the limits are routinely approached with no concern unless exceeded. If the report is to be useful for CERCLA remediation projects, also list the annual excess radiation dose allowed from a remediated site to achieve the maximum lifetime excess risk of one in ten thousand (a few millirem). DOE's fiercest opponents would be calmed if the report did not state that radiation standards are set "to ensure that health and safety are protected."

The interesting section on *Environment Monitoring* should be retained in some form. In the discussion on page 10 of the 1997 report, doses from x-rays are again quoted without indicating whether they are corrected for exposure of only a portion of the body. DO NOT use as one comparison the dose received by sleeping next to a spouse, since this comparison is remarkably inflammatory to nuclear dissenters. To emphasize that the body contains some natural radioactive materials, give the effective dose a typical person receives from his or her own body. As indicated in the comment on page 5 below, the treatment of the methylmercury contamination of fish caught in Poplar Creek must be more complete.

The statement at the end of the Summary, the "bottom line," would be more acceptable to anti-nuclear activists if the maximum off-site risk were estimated directly rather than having the dose compared to natural background.

The Full Annual Site Environmental Report for 1997

In addition to the Summary, the report should begin with care. Contrary to the suggestion on page 2 of the 1997 report, the region within five miles of the ORR is no longer very rural. We suggest the use of the enclosed map (Attachment 2) or a variant to suggest the present status.

A summary of each chapter is needed discussing the significant and major points. The "abstracts" now included at the beginning of each chapter are not abstracts but rather might be called subtitles.

The major problems our members encountered with the Site Environmental Report related to the enormous amount of material covered. The meaning of many small sections was not readily grasped. Since the report size must be limited, we suggest that many topics be covered with summary statements that give references to other reports for details, while each year's chosen banner topics could receive sufficient attention that the reasonably prepared reader would understand the results and their significance. Except for matters of greatest interest, we suggest that the "banner topics" should differ from year to year.

To illustrate the need for detailed coverage of some topics, consider the risks to users of the Clinch River (including its Poplar Creek embayment) and Watts Bar Reservoir. There is concern that the methylmercury content of consumed fish from Poplar Creek and the Clinch River might pose a risk to a developing fetus of a fish consumer. Indeed, the 1997 report does include the concentration of mercury in sunfish caught where Poplar Creek enters the Clinch. There is no statement that experience shows sunfish to accumulate methylmercury as much or more than other species. There is no statement that prior work has shown that location to harbor fish with higher methylmercury than other attractive fishing grounds on the waterway. There was no other sampling point downstream of the entrance to Poplar Creek in 1997.

On another page there is a simple statement that the dose to a fish consumer at that spot was twice the EPA Reference Dose. The statement has no meaning unless one knows whether the Reference Dose used was for an adult or for a fetus, and how much fish it was assumed the prospective mother consumed! The topic begs for a statement that a woman would have needed to eat one pound of sunfish per week from that location (or per day or per month as the case may be) in order to reach the reference dose based on developmental damage to her fetus. The Summary document refers to a FDA action level, but that too is ambiguous to the layman.

The background section indicates "...the results are compiled in the report *Environmental Monitoring on the Oak Ridge Reservation: 1997 Results* ." Include in the 1998 version of the present series how the 1998 results may be accessed electronically.

It may be helpful to the reader's understanding of the extent of activities conducted on the ORR to include an activities summary table for each site, either in the background section or in the Appendix to the document. This table could show 5-10 year ranges and could reflect significant activity and operational changes at the facility including implementation of regulatory programs. As the plan is updated annually, the reader could gain a complete perspective of the facilities' operations.

While Sections 3 and 4 provide detailed information regarding regulatory drivers (RCRA, CERCLA, NEPA, CWA, etc), it would be helpful to have an Environmental Compliance summary table in Section 2 that would address the regulatory status of each site and indicate whether any compliance issues are unresolved or are outstanding.

Based on the background information in Section 1 and the data collected in Sections 6 and 7, authors should consider including any risk-based evaluations conducted at the facilities and provide these as a summary table within the document or in an Appendix to the document.

The ASER with its wide distribution could serve as a reference document for normal background levels of contaminants. In general, there are tables where results are compared to limits or standards. If a reader needs to learn the normal background levels of uranium in soil, he finds that the 1997 ORR ASER reports that soil sampling was discontinued in 1997,

although the report has an entire chapter devoted to "Radiation." Contextual information with a comparative chart of background uranium levels in soils along with monitoring data would be helpful. For reference, tabulate or reference background levels of some contaminants not currently monitored in case a reader refers to the report seeking that information.

Discuss the QA/QC results of outside laboratories with the same detail as for the Lockheed Martin Laboratories as an indicator of data quality (Table 8.1) for the monitoring program. Section 8 on "Quality Assurance" presents QA/QC results for Lockheed Martin laboratories. Section 8.3.3 mentions the QA program for subcontracted laboratories selected for analytical work not performed in-house. Accelerated by the transition to the M&I contractor, greater emphasis is being placed on subcontracting with outside laboratories. Although there is no evidence that outside laboratories have unresolved QA/AC issues, future reports will need to discuss the QA/QC results of those outside laboratories.

Highlight potential key concerns. The TSCA Incinerator was a key concern of stakeholders and needed to be addressed. Where TSCAI is discussed (on pp. 5-16 and 17) seek to explain why TSCAI ambient air stations are activated only on upset conditions and explain the uranium monitoring of the stack. The end of p. 4-5 refers to "continuous" monitoring of the TSCA incinerator stack for radionuclides. Discussions with members of our committees defined "continuous" monitoring to imply availability of results within a few minutes, so the text is confusing. The results on the next pages are scattered and hard to comprehend. The suggested extended treatment would be an example of highlighting special studies that have been performed.

The remaining points indicate difficulties we experienced with the 1997 report that might not be directly applicable to future reports. These points do illustrate the types of content that should be considered.

- Trends should be explained. On p. 4-3 (Figure 4.1 and 4.2), why is there a big reduction in total uranium released to the atmosphere in 1993, while the radioactivity from uranium remains about constant? As another example, on p. 4-7 (Figure 4.4 and 4.5), what is the reason for the big drop in ^{3}H and ^{131}I in 1997, and the big increase in ^{41}Ar? Also see p. 4-9 (Figures 4.8 and 4.9) and p. 4-11 (Figure 4.10). In Section 4, "Effluent Monitoring," in Table 4.4, Y-12 reported 98,000 lb. of HCl emitted in 1997. The reported amount of HC1 emitted in the 1996 report was 870 lb/yr. It is not clearly explained that the difference is due to an EPA emission factor being published for HCl emissions from coal combustion that was not previously available, not that the emissions increased. The chemical emission report from ORNL and ETTP list only a few "criteria" and toxic pollutants from air permits. If the quantities of other released chemicals do not meet thresholds for the Toxic Release Inventory report, the calculated emissions could be reported anyway in the ASER with a statement that they are below the reporting threshold.
- Do not rely so heavily on the acronym list. An acronym should be spelled out the first time it is used. Unnecessary acronym use discourages the novice reader.

- Discuss the real risks after remediation. On p. 4-30, mercury effluent from Y-12 is discussed but no results are given. On p. 5-36 (Section 5.8.21) regarding Canada geese, how does the average Cs^{137} level compare to non ORR geese, and what is the dose significance?
- Clarify the data used for monitoring. The ASER is probably difficult for parts of its audience to review with the presentation of a lot of data.
- P. 5-11 (Figure 5.7) - cute but non-standard
- P. 5-34 (Table 5.19) – define the significance of negative values
- P. 4-7 refers to TVS at ETTP, but does not identify it. (We are surprised that "controlled" venting of UF6 is still allowed, as opposed to use of a trap or transfer to another cylinder.)
- P. 4-13, "allowable" amounts of emissions are given. On what basis were the "allowances" set. Perhaps prior year emissions at full production are the basis, rather than any health/safety basis.
- P. 4-18, quotes the largest "sum of DCG percentages" with unwarranted precision. We hope the term "DCG" is defined other than in the glossary, including the standard from which the DCG was derived.
- P. 5-6, Table 5.2, suggests gross alpha activity is 10 times or more the total of the uranium activities. This comparison begs for determination of what other alpha emitters are present.
- P. 5-6 describes shutdown of sampling programs on the basis of budget. The level of need must be discussed
- P. 5-6 and 7, Tables 5.2 and 5.3 give isotopic analyses through 1997, p. 5-8, (perhaps different monitors yield) only total uranium and U-235 results. This change is hard to understand, since there is more hazard from U-234 if alpha particle emission is important. Total uranium determinations are quite apt to mislead the reader, who may assume an incorrect isotopic analysis of the uranium. The ASER should distinguish cases in which an actual analysis of all isotopes is performed versus cases in which some isotopes are calculated based on empirical relationships from process knowledge or isotopic enrichment of naturally occurring uranium
- Tables that give only building numbers are usually meaningless to the public.

The ORSSAB hopes that the recommended changes listed above will help make this important report series more useful to all.